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SUMMARY

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THE PULPING PROCESSES OF TODAY AND THEIR MAIN CHARACTERISTICS

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The pulping processes of today and their main characteristics.

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Summary

The pulp industry of today is characterized by vigorous expansion, and alongside this rise in production far-reaching technical development is also in progress.

The principal raw materials for the production of pulp are softwoods and hardwoods, but in certain areas agricultural residues, grasses and reeds are also of importance.

Pulps may be classified according to the yield obtained; today it is possible to get any pulp yield desired between 35 and 100 per cent. A classification more correct from a theoretical standpoint might perhaps be made on the basis of the mechanical work needed to defibrate the wood which has to a major or minor extent been prepared by chemical treatment.

A brief description is provided of the main characteristics of the following processes and suitable utilization of the pulps produced:

The sulphite process, in its traditional form, continues to dominate the world production of sulphite pulp. The use of bases other than calcium, for example soluble bases, has recently shown a constant increase in some pulp producing countries. The most evident advantage of the sulphite pulping processes is that they give bright and easily bleached pulps, and these processes are extremely flexible as regards pulp quality. The major disadvantage of the conventional sulphite process is the difficulty experienced in pulping some common wood species. The main raw-materials are spruce and hardwoods. Annual plants are used in isolated cases only. Currently, this process is undergoing vigorous development. These improvements include: evaporation and combustion of the waste liquor, the use of soluble bases, multistage cooking, chemical recovery of soluble bases, and so on.

The Mg and Na bisulphite processes are very interesting and promising variants of the sulphite pulping process. In order to avoid attack on the fibres resulting from the acid nature of the conventional cooking liquor, these methods are based upon the same chemicals but with no excess of sulphur dioxide. They are particularly appropriate for hardwoods, but a wide variety of other wood species may be used. These methods are extremely flexible as regards pulp quality.

The sulphate process has always been marked by effective heat economy and

chemical recovery. Almost every kind of wood species may be utilized, and the process is also popular for straw, bagasse, bamboo and reeds. The paper obtained from this pulp is the highest in strength. The unbleached pulp is very dark, but can be bleached to a high degree of brightness and strength by means of chlorine dioxide. The method becomes more economic with increase in size of the units.

The semichemical process consists of a moderate chemical cook followed by mechanical fiberizing which completes the reduction of the chips to fibres. All the currently known chemical pulping processes may by adaptation enter the semichemical high yield range. The method most generally employed is the Neutral Sulphite Semi-Chemical process, known as the NSSC-method. Hardwoods are the main raw-materials, but straw and bagasse are also used. NSSC-pulps are easily hydrated, and are characterized by low opacity and great flexibility.

The chemigroundwood process constitutes an interesting attempt to apply the conentional groundwood process to hardwoods. A mild chemical treatment of the wood in log form precedes the mechanical defibration in any conventional wood pulp grinder.

The cold soda process is another chemi-mechanical pulping method which uses hardwood chips as raw-materials. Agricultural residues and grasses may also be pulped by this process. The chemically pretreated chips are defibrated in disc refiners.

The groundwood process generally makes use of softwoods, and particularly spruce, as raw-materials. The main advantage of the process is the almost quantitative yield obtained. A new method is being developed in which groundwood pulp is obtained from chips instead of logs.

Other processes, mainly used for the production of pulp from agricultural residues and other one-year plants, are mentioned and briefly discussed. These include the monosulphite process, the soda-chlorine process, the cold alkaline method and the mechano-chemical method.

Apart from these commercially employed processes, methods are mentioned which generally speaking are of academic interest alone, for instance the nitric acid method, although it is employed in a few cases, and methods using organic solvents. Hydrotropic pulping is one of the most recent methods mentioned.

Other agents proposed for the pulping of wood include chlorine, sodium hydrosulphite, sodium chlorite, chlorohydrins and acetic acid.

The circumstances which have to be considered if a pulp mill is to be built are mentioned, as well as the use of tropical woods for pulp and paper making.

S - 538 E - Oct.1962 - 1,600